



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject:

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Change:

USE OF PORTABLE ELECTRONIC DEVICES ABOARD AIRCRAFT

1. PURPOSE. This advisory circular (AC) provides aircraft operators with information and guidance for assistance in the compliance of Federal Aviation Regulations (FAR) Section 91.21. Because of the potential for portable electronic devices to interfere with aircraft communications and navigation equipment, FAR Section 91.21 was established. It prohibits the operation of portable electronic devices aboard U.S.-registered civil aircraft, operated by the holder of an air carrier operating certificate or an operating certificate, or any other aircraft while operating under instrument flight rules. The rule permits use of specified portable electronic devices and other devices that the operator of the aircraft has determined will not cause interference with the safe operation of the aircraft in which it is operated. The recommendations contained herein are one means, but not the only means, of complying with the requirements of FAR Section 91.21, pertaining to the operation of portable electronic devices.

2. CANCELLATION. AC 91-47, Use of Portable Electronic Devices--Radio Receivers, dated March 23, 1977.

3. RELATED FAR SECTIONS. FAR Section 91.21.

4. BACKGROUND. FAR Section 91.21 (formerly 91.19) was initially established in May 1961 to prohibit the operation of portable frequency-modulated radio receivers aboard U.S. air carrier aircraft and U.S.-registered aircraft when the very high frequency omnidirectional range was being used for navigation purposes. The Federal Aviation Administration (FAA) subsequently determined that other portable electronic devices could be potentially hazardous to aircraft communication and navigation equipment if operated aboard aircraft. Amendment 91-35 amended the scope of former FAR Section 91.19 to prohibit the use of additional portable electronic devices aboard certain U.S. civil aircraft. Earlier studies conducted by RTCA, Inc. (RTCA), Special Committee 156, Document No. RTCA/DO-199, Volumes 1 and 2, entitled "Potential Interference To Aircraft Electronic Equipment From Devices Carried Aboard," have contributed greatly to an understanding of the operational effects of portable electronic devices aboard aircraft. (See paragraph 7b for obtaining copies.)

5. DISCUSSION. FAR Section 91.21 allows the operation of portable electronic devices which the operator of the aircraft has determined will not cause interference with the navigation or communication system of that aircraft. The determination of the affect of a particular device on the navigation and communication system of the aircraft on which it is to be used or operated can be made by the operator and/or the pilot in command. In some cases, the determination may be based on operational tests conducted by the operator without sophisticated testing equipment. When safely at cruise altitude, the pilot could allow the devices to be operated. If interference is experienced, the types of devices causing interference could be isolated along with the applicable conditions recorded. The device responsible for the interference should then be turned off. If all operators collect this type of data with specific information, a large enough data base could be generated to identify specific devices causing interference. The operator may elect to obtain the services of a person or facility having the capability of making the determination for the particular electronic device and aircraft concerned. The rule as adopted was drafted to require the air carrier or commercial operator to determine whether a particular portable electronic device will cause interference when operated aboard its aircraft. This determination may be made by personnel specifically designated by the air carrier or commercial operator for this purpose. For other aircraft, the language of the rule expressly permits the determination to be made by the pilot in command or operators of the aircraft. Thus, in the case of rental aircraft, the determination could be made by the renter-pilot, lessee, or owner-operator.

6. RECOMMENDED PROCEDURES FOR THE OPERATION OF PORTABLE ELECTRONIC DEVICES ABOARD AIRCRAFT.

a. If an operator allows the use of portable electronic devices aboard its aircraft, procedures should be established and spelled out clearly to control their use during passenger-carrying operations. The procedures, when used in conjunction with an operator's program, should provide, as a minimum, the following:

(1) Methods to inform passengers of permissible times, conditions, and limitations when various portable electronic devices may be used. This may be accomplished through the departure briefing, passenger information cards, captain's announcement, and any other method deemed appropriate by the

operator. The limitations, as a minimum, should state that use of all such devices (except medical) are prohibited during any phase of operation when their use could interfere with the ability of the flightcrew to give necessary instructions in the event of an emergency.

(2) Procedures to terminate the operation of portable electronic devices suspected of causing interference with aircraft systems.

(3) Procedures for reporting instances of suspected and confirmed interferences by a portable electronic device to the local FAA Flight Standards District Office for forwarding to the FAA Flight Standards National Field Office, AFS-500.

(4) Cockpit to cabin coordination and cockpit flightcrew monitoring procedures.

(5) Procedures for determining acceptability of those portable electronic components to be operated aboard its aircraft. The determination of the affects of a particular portable electronic device on the navigation and communication systems of the aircraft on which it is to be operated must be made by the operator of the aircraft. The operation of a portable electronic device is prohibited unless the device is specifically listed in FAR Section 91.21(b)(1) through (4) or pursuant to FAR Section 91.21(b)(5), whereby the operator determines that the operation of that device will not cause interference with the communication or navigation system of the aircraft on which it is to be operated.

(6) Prohibiting the operation of any portable electronic devices during the takeoff and landing phases of flight. It must be recognized that the potential for personal injury to passengers is a paramount consideration as well as the possibility of missing important safety announcements during these important phases of flight. This is in addition to lessening the possible interference that may arise during sterile cockpit operations (below 10,000 feet).

(7) Prohibiting the operation of any portable electronic devices aboard aircraft, unless otherwise authorized, which are classified as intentional radiators or transmitters. These devices include, but are not limited to:

- (i) Citizens band radios.
- (ii) Cellular telephones.
- (iii) Remote control devices.

b. Portable electronic devices designed to transmit have considerations in addition to paragraph 6a. There are certain devices which, by their nature and design, transmit intentionally. These include cellular telephones, citizens band radios, remote control devices, etc. These devices are typically licensed as land mobile devices by the Federal Communications Commission (FCC). **The FCC currently prohibits the use and operation of cellular telephones while airborne.** Its primary concern is that a cellular telephone, while used airborne, would have a much greater transmitting range than a land mobile unit. This could result in serious interference to transmissions at other cell locations since the system uses the same frequency several times within a market. Since a cellular mobile telephone unit is capable of operating on all assignable cellular frequencies, serious interference may also occur to cellular systems in adjacent markets. The FAA supports this airborne restriction for reasons of potential interference to critical aircraft systems. Currently, the FAA does not prohibit use of cellular telephones in aircraft while on the ground if the operator has determined that they will not cause interference with the navigation or communication system of the aircraft on which they are to be used. An example might be their use at the gate or during an extended wait on the ground, while awaiting a gate, when specifically authorized by the captain. A cellular telephone must not be authorized for use while the aircraft is being taxied for departure after leaving the gate. The unit must be turned off and properly stowed, otherwise it is possible that a signal from a ground cell could activate it. Whatever procedures an operator elects to adopt should be clearly spelled out in oral departure briefings and by written material provided to each passenger to avoid passenger confusion.

c. Those telephones which have been permanently installed in the aircraft are licensed as air-ground units and are operated on the allocated or assigned air-ground radio telephone service frequencies. In addition, they are installed and tested in accordance with the appropriate certification and airworthiness standards. These devices are not considered portable electronic devices provided they have been installed and tested by an FAA-approved repair station or an air carrier's-approved maintenance organization and are licensed by the FCC as air-ground units.

7. MANUFACTURERS' TEST CRITERIA FOR PORTABLE ELECTRONIC DEVICES.

a. Operators should use manufacturers' information, when provided, with each device that informs the consumer of the conditions and limitations associated with its use aboard aircraft.

b. All portable electronic devices should be designed and tested in accordance with appropriate emission control standards. Document Nos. RTCA/DO-160C, Environmental Conditions and Test Procedures for Airborne Equipment, and RTCA/DO-199, may constitute one acceptable method for meeting these requirements. These documents may be purchased from: RTCA Secretariat, 1140 Connecticut Avenue, Suite 1020, Washington, D.C. 20036.

c. The FCC, in conjunction with RTCA, is currently evaluating emission standards and appropriate classification markings for portable electronic devices that may be used aboard aircraft.



Thomas C. Accardi
Director, Flight Standards Service

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800 Independence Ave., S.W.
Washington, D.C. 20591

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